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June 22, 2000

To: Mississippi River/Gulf of Mexico Nutrient Task Force Members

At the June 15-16, 2000, meeting of the Mississippi River/Gulf of Mexico (MR/GM) Nutrient Task Force, the EPA asked the task force members to adopt a goal of 30 percent reduction in nutrient loading of the Mississippi River. Agricultural producers in the entire Mississippi River Watershed could be significantly negatively impacted by this proposal. In reality, it would set a precedent that could be interpreted as calling for reductions in nitrogen fertilizer use of up to 68 percent[1]. EPA is attempting to push this goal through in the next two weeks without farmers knowing about it or being able to discuss the ultimate effect of EPA's proposal. We urge you to not set a numeric standard for a nutrient loading reduction goal, as we believe it will be arbitrarily and unfairly interpreted and applied.

We also believe that both the six original hypoxia reports by the National Science and Technology Council Committee on Environment and Natural Resources and the final Integrated Assessment have failed to fully address the initial charge of the Harmful Algal Bloom and Hypoxia Research and Control Act, P.L. 105-383 which calls for examination of " the distribution, dynamics and causes;...methods of reducing nutrient loads...." P.L. 105-383 also calls for the development of a plan of action to reduce, mitigate and control hypoxia in the northern Gulf of Mexico.

To fully address the charge of P.L 105-383, we would also like to request that you consider adding language to the MR/GM Task Force's Action Plan that would recommend an amendment to existing law that would allow the Old River Control structure to be temporarily closed as an experiment to test the hypothesis that a reduction of 20 to 30 percent in the load of nutrients being discharged directly into the center of the hypoxic zone would decrease surface chlorophyll concentrations and increase bottom water dissolved oxygen concentrations. Please refer to the attached paper for more information about this idea.

Thank you for your consideration of these issues which are important to all of agriculture.

Sincerely

Bob Stallman
President

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[1] The final Integrated Assessment states that it would require a 45 percent reduction in nitrogen fertilizer use to reduce nitrogen losses at the edge of the field by 20 percent. Since EPA is calling for a 30 percent reduction in loading in the river which is at least 1.5 times greater than the 20 percent reduction predicted to occur at the edge of the field, it would logically require a similar 1.5 times reduction in fertilizer use (45% x 1.5 = 68%) or at least 68% reduction in fertilizer use.

This image was created using a MATLAB routine written by Richard Ellis of The MathWorks, Inc.

Figure 1

Figure 1. Depiction of the bottom topography of the Gulf of Mexico showing 2,000 to 4,000 meter deep water immediately off the end of the birdsfoot delta at the mouth of the Mississippi River vs. the 10 to 50 meter shallow coastal shelf at the mouth of the Atchafalaya River.

Reducing Hypoxia in the Gulf of Mexico: Closing the Old River Control, A Testable Hypothesis.[1]

Abstract: Nutrients (particularly nitrogen) in fresh water delivered by the Mississippi River have been cited as the primary cause of hypoxic conditions in the shallow coastal waters of the northern Gulf of Mexico. This paper will examine how this theory could be tested relatively quickly by closing the Old River Control to cause most of the flow of the Mississippi River to enter the Gulf of Mexico at a point closer to the deeper water of the Gulf rather than entering the shallow water on the coastal shelf where conditions for hypoxia are more likely to exist.

Background: The initial charge of the Harmful Algal Bloom and Hypoxia Research and Control Act, P.L. 105-383 called for examination of " the distribution, dynamics and causes;...methods of reducing nutrient loads...." P.L. 105-383 also calls for the development of a plan of action to reduce, mitigate and control hypoxia in the northern Gulf of Mexico. Both the six original CENR hypoxia reports and the final Integrated Assessment have failed to fully address these issues.

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[1] Authors: Porterfield, J.W., Francl, T.L., American Farm Bureau Federation, Park Ridge, IL.

This paper presents new information related to two statements within the final Integrated Assessment of Hypoxia in the Northern Gulf of Mexico which may have significant bearing on actions recommended by the Mississippi River Gulf of Mexico Nutrient Task Force in relation to EPA's proposed arbitrary 30 percent reduction in nitrogen loading in the Mississippi River.

On page 4 of the final Integrated Assessment the following statement is made:

> "Model simulations indicate that nutrient load reductions of about 20-30 percent would result in a 5-15 percent decrease in surface chlorophyll concentrations and a 15-50 percent increase in bottom-water dissolved oxygen concentrations. Such increases in oxygen are significant because they represent an over all average for the hypoxic zone, and any increase above the 2 mg/l threshold will have significant positive effects on marine life."

Our analysis of this statement is that, in fact, the quickest way to test the nutrient enrichment theory is to suspend all diversion of Mississippi River flow into the Atchafalaya River, which consequently goes directly into the center of the hypoxic zone, a shallow shore highly suseptable to stratification. Such action will immediately reduce the flux of both nitrate and total nitrogen that moves into the heart of the most sensitive part of the hypoxic zone from the Mississippi River by 33.9 percent.[1],[2] At this point, there is a much greater opportunity for the fresh water to mix in the deeper parts of the Gulf and minimize any subsequent stratification which is the other key component of hypoxia, see Figure 1.

This idea is part of the public record contained in the comments submitted in December, 1999, by the American Farm Bureau Federation regarding the Draft Integrated Assessment. This approach was briefly acknowledged in a three-sentence footnote at the bottom of page 37 of the final Integrated Assessment. However, the third sentence of the footnote summarily dismissed the idea by stating "This option would have multiple consequences and has not been analyzed."

It is important that this option be analyzed, because it is technically possible to test it with a simple action of temporarily closing the Old River Control structure that regulates diversion of flow from the Mississippi River into the Atchafalaya River, see Figures 2 and 3. The Atchafalaya River discharges directly into the center of the hypoxic zone on the shallow coastal shelf of the Gulf of Mexico, see Figure 1. For hypoxia, this appears to be the worst possible scenario because fresh water from the river with its load of nitrogen is easily stratified above the denser salt water. According to the Integrated Assessment, the two key components that must both be present for hypoxia to occur are stratification and nitrogen.

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[1] 50% of MS River flow and nitrogen is lost to deep water in the Gulf of Mexico and 40% of the remaining 50% of the flow and nitrogen of Mississippi River exiting out of birdsfoot delta south of New Orleans never make it to the hypoxic zone. Based on unpublished paper dated November 29, 1999, prepared by Donald F. Boesch, University of Maryland Center for Environmental Science for Gulf Hypoxia Science Meeting.

[2] Diversion of Mississippi River flow into the Atchafalaya River is based on the formula: Flow diverted from MS River = (30% x(Flow in Red River + Flow in Mississippi River)) - Flow in Red River. Currently, based on this formula, about 22% of the Mississippi River flow gets diverted into the Atchafalaya River. Personal communication with Chuck Shadie, Corps of Engineers, New Orleans District.

Recent data presented by U.S.G.S.[3] show a very strong correlation (R^2 between 0.86 to 0.93) between the size of the hypoxic zone and the flux of nitrate and streamflow during the May – June time period of each year. While there are many factors involved in gulf hypoxia, this adds further credence to the idea that experiments should be conducted on reducing the rate of streamflow diversions of Mississippi River water into the Atchafalaya River in order to reduce the amount of nutrients introduced into the area of the Gulf of Mexico that is most likely to foster hypoxic conditions.

Vicksburg, Mississippi, is just north of the Old River Control structure. With the exception of June of 1943, the top 20 mean monthly flows of the Mississippi River at Vicksburg between 1931 and 1997 have occurred in January through May. None of the floods of 1993 even make the top twenty in terms of average monthly flows. The levees protecting New Orleans are designed to handle flows of 1.25 million cfs. The Bonnet Carre Diversion structure above New Orleans can move 250,000 cfs into Lake Ponchartrain. From looking at the Table 2 below, it would appear that since 1931, average monthly flow of the Mississippi River at Vicksburg would have exceeded the average design flow of the Mississippi River below Baton Rogue in only 10 of the 804 months. This means that unless some really extreme flow event occurred, more that 98 percent of the time it would be physically possible to test the theory of putting the entire flow of the Mississippi River, up to 1.5 million cfs, out through the birdsfoot delta below New Orleans (1.25 million cfs) and Lake Ponchartrain (250,000 cfs if necessary) especially during Januray-June when the bulk of the nitrate flux occurs. (See Figure 4, Project Design Flood.) This information was not included the final Integrated Assessement.

Table 2. Mean Monthly Flow of Mississippi River at Vicksburg between 1931-1997:

Rank	year	Month	Flow cfs
1	1937	2	1,944,286
2	1973	5	1,850,129
3	1945	4	1,847,500
4	1950	2	1,796,357
5	1973	4	1,774,333
6	1983	5	1,623,290
7	1979	4	1,564,067
8	1975	4	1,561,167
9	1991	1	1,509,323
10	1949	2	1,500,250
11	1945	3	1,494,129
12	1997	3	1,469,545
13	1984	5	1,457,645
14	1950	3	1,414,194
15	1944	5	1,391,710
16	1943	6	1,382,933
17	1974	2	1,379,893
18	1979	3	1,375,097
19	1962	4	1,368,000
20	1939	3	1,366,774

[3] Presentation by Don Goolsby, at Gulf Hypoxia Science Meeting, December 3, 1999 in St. Louis, MO.

Old

River

Control

US Army Corps of Engineers

New Orleans District

Figure 2

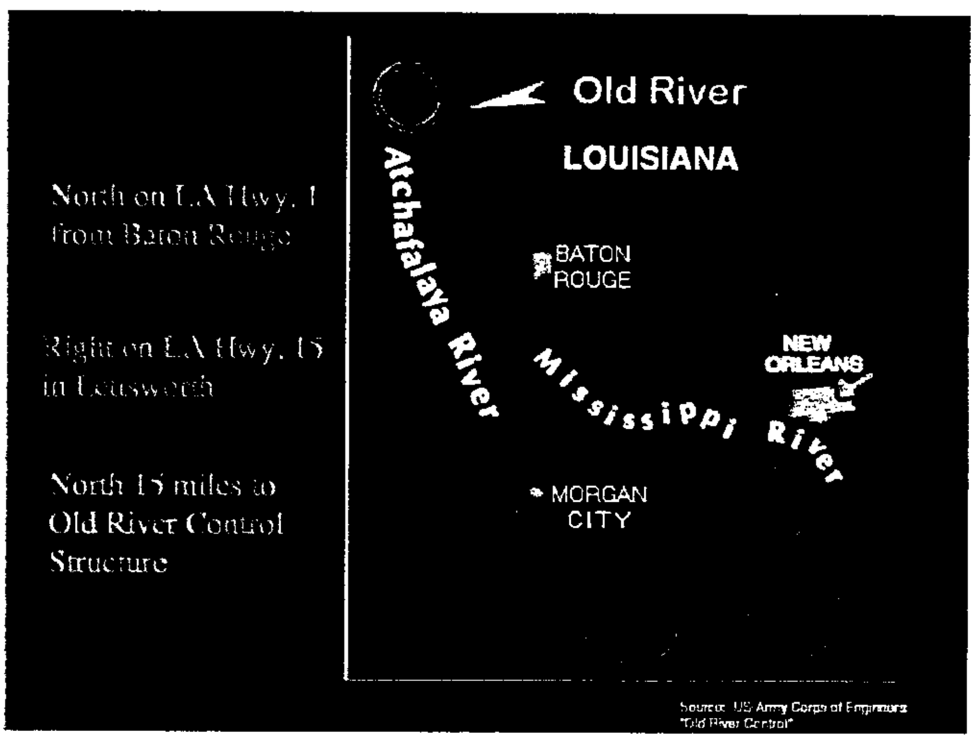

Figure 3

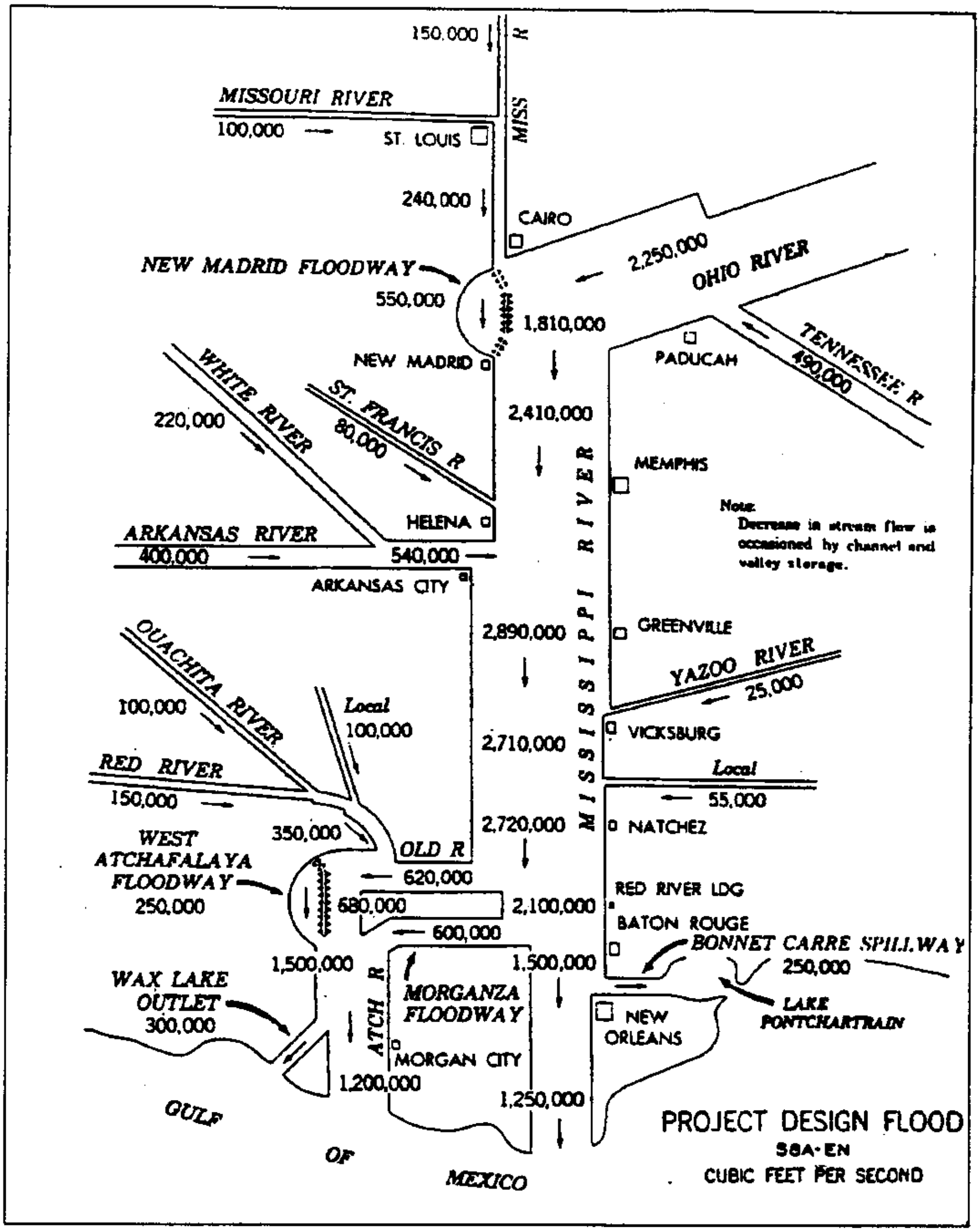
150,000
MISS R
MISSOURI RIVER
100,000
ST. LOUIS
240,000
CAIRO
2,250,000
OHIO RIVER
NEW MADRID FLOODWAY
550,000
1,810,000
NEW MADRID
PADUCAH
TENNESSEE R
490,000
WHITE RIVER
220,000
ST. FRANCIS R
80,000
2,410,000
MEMPHIS
HELENA
Note:
Decrease in stream flow is occasioned by channel and valley storage.
ARKANSAS RIVER
400,000
540,000
ARKANSAS CITY
MISSISSIPPI RIVER
2,890,000
GREENVILLE
YAZOO RIVER
25,000
OUACHITA RIVER
100,000
Local
100,000
2,710,000
VICKSBURG
RED RIVER
150,000
Local
55,000
WEST ATCHAFALAYA FLOODWAY
250,000
350,000
OLD R
2,720,000
NATCHEZ
620,000
680,000
2,100,000
RED RIVER LDG
BATON ROUGE
600,000
BONNET CARRE SPILLWAY
250,000
1,500,000
1,500,000
WAX LAKE OUTLET
300,000
ATCH R
MORGANZA FLOODWAY
NEW ORLEANS
LAKE PONTCHARTRAIN
MORGAN CITY
1,200,000
1,250,000
GULF OF MEXICO
PROJECT DESIGN FLOOD
58A-EN
CUBIC FEET PER SECOND

Figure 4